

Meeting 3 Agenda

AggData



Authors: Leo Fangmeyer, Peter Harkins, Ricky Pantin, Michael Pitz
Mentor: Professor Schafer
Agenda for 02/03 Meeting

Questions for Professor:

- Is the power supply designed on the PCB appropriate? Can you take a look at the design?
- Is it preferable to have all our sensors be I2C based? We have found some sensors that are analog based and just send an Analog Output signal to a GPIO? Are there any issues with using them?

Accomplished this past week:

- Wrote and uploaded code to an ESP32-32E that can send serial messages via LoRa, and code that can be uploaded to a separate ESP32-32 that can receive the transmission from the sender via LoRa.
 - These will serve as the starting point for the field module and the base station, but will not focus on both sending and receiving yet. It will only verify that a connection can be established between the ESP32 and the LoRa radio
- Managed to get ESP32-32E to receive data from an accelerometer (MAG3110) via I2C and documented code.
- Based on previously mentioned code, wrote code that would have one particular ESP32-32E send values obtained from an accelerometer to another ESP32-32E via LoRa, which would in turn turn on a Red, Blue or Green LED (“actuator”) depending on the received y-value from the accelerometer.
 - Code can be found in Code folder, listed as esp32_lora_receiver_v2_leds.ino and esp32_lora_sender_v2_i2c.ino
- Compiled preliminary list of sensors that could be used for the field device and varied based on communication protocol (In Drafts and Active Documents folder)
- Began initial test PCB design. Eagle files and libraries can be found in Board Design Folder and Board Design Folder (For Meeting 3) in the Meeting 3 folder. The test PCB includes:
 - Power Supply Circuit.
 - ESP32 with all pins brought out to header pins
 - RFM95CW with all pins brought out to header pins
 - Serial programming port, SPI and I2C pins are displayed.
 - LED “actuators” are displayed
 - Button that is connected to an IO pin that can be used as a user interface.
- Compiled a list of all pins that will be used on ESP32 and their functionality.

Pete, Leo and Ricky set-up breadboards with Sparkfun Boards (have ESP32 and RFM95CW integrated), MAG3110 accelerometer and LED's. Developed code listed above and tested it on the breadboards.

Pete and Pitz designed the initial test PCB and documented all pins that will be used on ESP32. Pete, Leo, Ricky, and Pitz drafted a list of potential sensors that will be used.

To do:

Tasks this week fork into two sections: software development and hardware development.

Software:

- Ensure basic code is working by testing with two LoRa modules one we get the other one back.
- Look into server or html creation using the ESP32
- Develop functionality to send messages back and forth between two modules by combining, integrating, and possibly supplementing what we currently have

Hardware:

- Continue developing initial design for PCB
 - Start determining which sensors will be I2C based and which will be analog based.
 - Based on these decisions, integrate sensors into field devices and make proper connections. Sensors will need to be in a separate module from the actual field device.
 - Once the test board has arrived, test LoRa connection to ESP32 via SPI. After the test, finalize integration of LoRa transceiver and ESP32 on the board.
 - Confirm the Power Circuit that has been initially designed is appropriate and continue researching if necessary.
- Have a draft of a power matrix for the ESP32 and determine which power mode combination is most efficient.

Action Items:

- Need board and parts ordered
 - If Prof. Schafer can check our board before ordering, board ordered by 02/03
 - Order parts we need for certain - order out by 02/03 @ 8:30 AM
- Power Matrix due by 02/10
 - Hopefully have a concise and robust list for power matrix by 02/09 so we can discuss during meeting